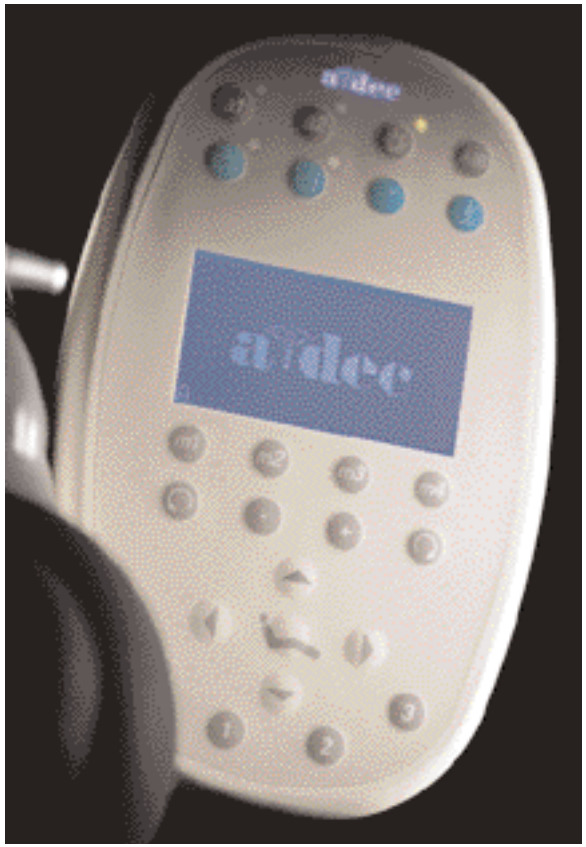

A-dec 500 offers a variety of programming options. The DCS technology used in the A-dec 500 product allows programmability of the touchpad(s) and footswitch. Some of the features that can be programmed are:

- Handpieces — operation, speed and air/water coolant
- Chair operation and back/base positions
- Dental light On/Off, and composite intensity setting
- Cuspidor operation and cup fill/bowl rinse timing
- Dual operator settings

This section provides programming information for all of the A-dec 500 modules as well as information related to servicing, maintenance, and adjustments. Detail on how to service the touchpads and troubleshoot specific problems is presented. For information on service parts, see the *Genuine A-dec Service Parts Catalog* or contact A-dec customer service.

How to Program the Chair

Position Programming

1. Position the chair to the desired operating position, using the manual controls (arrows) on the touchpad or footswitch.
2. Press and release **Program** button (one beep).
3. Press a position button (three beeps).

Position 3 (X-ray/Rinse)

Position 3 can be programmed as either an x-ray/rinse position or a programmed position. To program Position 3, press and hold **Program** and **Position 3** together for three seconds.

One beep confirms that the position can be programmed. To return to the x-ray/rinse position, repeat.

Three beeps confirms that the x-ray/rinse function is on.

NOTE: Disabling the x-ray/rinse function is a global function for the dual operator mode (A/B) on a deluxe touchpad.

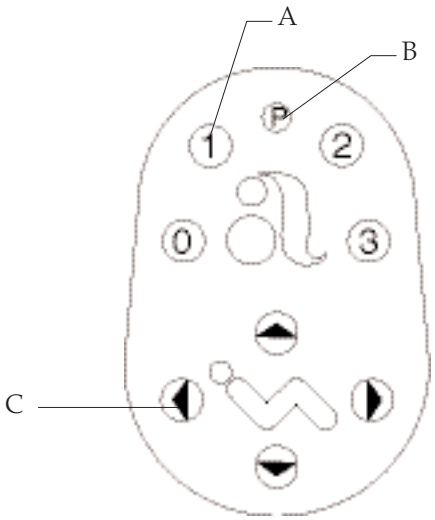

Figure 8. Footswitch buttons. (A) position button; (B) program button; (C) manual control

Footswitch Icons

Icon	Description	Icon	Description
0	Entry/exit		Back down
1	Position 1		Base down
2	Position 2		Back up
3	Position 3 (x-ray/rinse)		Base up
P	Program button		

How to Program the Delivery System

When programming the delivery system, one beep indicates program mode and three beeps confirms programming. When overriding features (Auto On/Off dental light function and Position 3 [x-ray/rinse], and combined air/water coolant), one beep means the factory preset is disabled and three beeps means the factory preset is active.

Touchpad Icons

Icon	Description	Icon	Description
0	Entry/exit	a1	a1 auxiliary 1
1	Position 1	a2	a2 auxiliary 2
2	Position 2		Light
3	Position 3 (x-ray/rinse)	A/B	Dual operator mode (A/B)
	Program button		Water coolant
	Back down		Air coolant
	Base down	m1	Memory positions (M1-M4)
	Back up		Forward
	Base up		Reverse
a-dec	Status icon	+	Increase
	Cup fill	-	Decrease
	Bowl rinse		

Figure 9. Standard touchpad. (A) indicator light

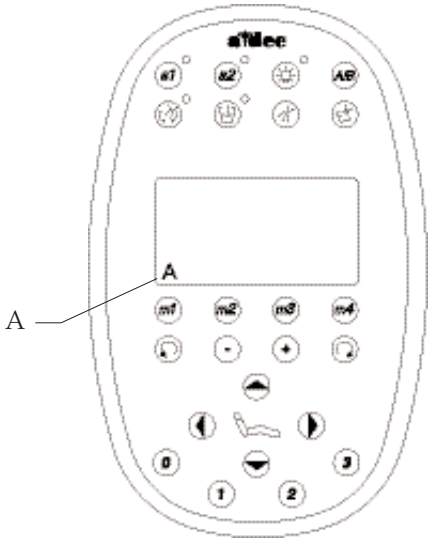

Figure 10. Deluxe touchpad. (A) operator mode

Dual Operator Mode (A/B)

The dual operator mode on the deluxe touchpad provides additional programmable positions for a second operator. To program the delivery system for two operators, first select the operator mode being programmed **(A/B)**. A letter in the lower left corner of the touchpad screen will appear showing the active mode. Program the appropriate function.

Handpiece Configuration for Deluxe Touchpad

To field install a handpiece or upgrade to a deluxe touchpad, configure each handpiece position.

- Press and hold **Program** and **A/B** together until the touchpad switches to "select handpiece."
- Activate the handpiece being configured, and follow the steps displayed on the touchpad screen.

Programming Memory

The memory settings (M1-M4) are different for both operator **A** and **B** modes and for each handpiece position. All memory settings are factory preset with both the air and water coolant on.

Electric Micromotor

When activated, the desired maximum RPM can be programmed into one of the four pre-programmed memory settings. To adjust the RPM limit, use **Plus (+)** and **Minus (-).** Select water and air coolant to be on or off, and press **Program** and the **Memory** button (m1-m4). Three beeps confirms the setting. The total range is 300-40,000 RPM. An RPM limit bar shows the RPM level for the electric micromotor.

EXAMPLE: If the RPM limit is set for 40,000 RPM and the power limit bar shows half, then the electric micromotor is operating at approximately 20,000 RPM.

The maximum RPM limits are preset to the following:

Preset	Maximum RPM
m1	2,000
m2	10,000
m3	20,000
m4	40,000

Scaler

When activated, the desired power level can be programmed into one of the four pre-programmed memory settings. To adjust the power level (0 to 100%), use **Plus (+)** and **Minus (-)**. Select water coolant to be On or Off, and press **Program** and the **Memory** button (m1-m4). Three beeps confirms the setting. A power limit bar shows the power level to the scaler.

EXAMPLE: If the power limit is set for 50 percent and the bar shows half, then the scaler is operating at approximately 25 percent power.

The maximum power level limits are preset to the following:

Preset	Power Level Limit
m1	25%
m2	50%
m3	75%
m4	100%

NOTE: When the deluxe touchpad displays zero percent, the scaler continues to operate at minimum power causing tip movement.

WARNING: Do not attempt to change the scaler tips when the unit is operating.

How to Program the Cuspidor

Cup Fill and Bowl Rinse Functions

Cup fill and bowl rinse functions can be programmed using a touchpad or the combination of a footswitch program button and the appropriate button on the cuspidor tower.

1. Press **Program** (one beep).
2. Press and hold **Cup Fill** or **Bowl Rinse** for desired time.
3. Release button (three beeps).

How to Program the Dental Light

Dental Light (Auto On/Off)

The Auto On/Off setting can be turned off by pressing and holding **Program** and **Light** together for three seconds. One beep confirms the function has been turned off. To enable the function, repeat.

Three beeps confirms the Auto On/Off function is on.

LED Troubleshooting

These tables are intended for use when diagnosing equipment problems using the circuit board LEDs. The most common problems that may be encountered are shown. The first table lists problems commonly diagnosed by phone with the dental staff. Additional tables show more complex troubleshooting.

LED	Assistant's Touchpad and Standard Touchpad	Deluxe Touchpad
Status (A-dec logo)	Off = System is not functioning	
	Blue steady = Normal condition (ready for use)	
	Blue double blink = Jumper is in factory default position on the chair circuit board	
	Blue slow blink = Chair, cuspidor, or lower support arm stop switch is activated	
Dental light	Off = Dental light is off	
	Yellow steady = Dental light is on in high or medium intensity	
	Yellow slow blink = Dental light is on in composite intensity	
Auxiliary #1 or bowl rinse	Off = Auxiliary #1 is off or bowl rinse is off	N/A (see bowl rinse)
	Yellow = Auxiliary #1 is on or bowl rinse is on	N/A (see bowl rinse)
Auxiliary #2 or cup fill	Off = Auxiliary #2 is off or cup fill is off	N/A (see cup fill)
	Yellow = Auxiliary #2 is on or cup fill is on	N/A (see cup fill)
Bowl rinse	N/A (shared with auxiliary #1 above)	Off = bowl rinse is off
		Yellow = bowl rinse is on
Cup fill	N/A (shared with auxiliary #2 above)	Off = cup fill is off
		Yellow = cup fill is on
Auxiliary#1 or #2	N/A (shared with auxiliary #1 or #2 above)	Off = Auxiliary device is off
		Yellow = Auxiliary device is on

Off = Function is turned off, device is disconnected, no power, or failed circuit board

Blue steady = Normal operation

Yellow = Advisory

LED	A-dec Relay Module	Dental Light	Cuspidor	Delivery System	Chair
AC power	Off = No 24 VAC power, open circuit breaker, power supply turned off, no line voltage				
	Green steady = 24 VAC power at terminal strip				
Status	Off = System is not functioning, no power or circuit board has failed				Off = System is not functioning, no power or circuit board has failed
	Green steady = normal condition				**Green steady** = normal condition
					Green double blink = jumper is in the factory default position
Data (DCS)	Off = No data communication, not connected to the data line connector, data line is not functioning				
	Green steady = Active DCS is detected				
	Green double blink = Valid DCS message				
A-dec relay	Off = Relay is off	N/A	Off = Relay is off	N/A	N/A
	Yellow = Relay is on		**Yellow** = Relay is on		
Bowl rinse/cup fill relays	N/A	N/A	Off = Relay is off	N/A	N/A
			Yellow = Relay is on		
Cuspidor stop switch	N/A	N/A	Off = Closed (normal)	N/A	N/A
			Red = Open (activated)		
IOLS output	N/A	N/A	N/A	OFF = IOLS voltage is OFF	N/A
				Yellow = IOLS voltage is on	
Scaler relay	N/A	N/A	N/A	Off = Scaler relay voltage is off	N/A
				Yellow = Scaler relay voltage is on	

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<table>
<tr><th>LED</th><th>A-dec Relay Module</th><th>Dental Light</th><th>Cuspidor</th><th>Delivery System</th><th>Chair</th></tr>
<tr><td>Air/water coolant solenoids</td><td>N/A</td><td>N/A</td><td>N/A</td><td>Off = Solenoid is off

Yellow = Solenoid is on</td><td>N/A</td></tr>
<tr><td>Chair or lower support arm stop switch</td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td><td>Off = Closed (normal)

Red = Open (activated)</td></tr>
<tr><td>Chair lockout</td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td><td>Off = Open (normal)

Red = Closed (activated)</td></tr>
<tr><td>Vacuum Relay</td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td><td>Off = Vacuum relay is off</td></tr>
<tr><td></td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td><td>Yellow = Vacuum relay is on</td></tr>
<tr><td>Dental light</td><td>N/A</td><td><table><tr><th>DS4</th><th>DS5</th><th>Function</th></tr><tr><td>Off</td><td>Off</td><td>Off</td></tr><tr><td>On</td><td>Off</td><td>High intensity</td></tr><tr><td>Off</td><td>On</td><td>Composite intensity</td></tr><tr><td>On</td><td>On</td><td>Medium intensity</td></tr></table></td><td>N/A</td><td>N/A</td><td><table><tr><th>DS8</th><th>DS7</th><th>Function</th></tr><tr><td>Off</td><td>Off</td><td>Off</td></tr><tr><td>On</td><td>Off</td><td>High intensity</td></tr><tr><td>Off</td><td>On</td><td>Composite intensity</td></tr><tr><td>On</td><td>On</td><td>Medium intensity</td></tr></table></td></tr>
<tr><td>Chair position sensors</td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td><td>Off = Sensor not connected, bad connection, moving in wrong direction, limited range of motion, or cable not on wheel</td></tr>
<tr><td></td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td><td>Yellow steady = Normal operation</td></tr>
<tr><td></td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td><td>Yellow fast blink = Upper end of travel</td></tr>
<tr><td>Back and base relays</td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td><td>Off = Relay is off</td></tr>
<tr><td></td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td><td>Yellow = Relay is on</td></tr>
</table>

How to Program Touchpads

The touchpads are the primary user interface for the A-dec 500 system. The buttons on the touchpad position the chair, initiate the cup fill and bowl rinse, and turn the dental light on and off. The deluxe touchpad has an LCD display and additional buttons for memory control.

Factory Preset Functions

The disable/enable function located on the chair circuit board, applies to any touchpads or footswitch attached to the A-dec 500 system. However, the disable/enable function does not carry over with touchpads if they are removed from one system and installed on another system.

Disable/Enable the Footswitch or Touchpad

Disable

1. Place the "spare" jumper in the "**EN**/**DIS TP**/**FS**" position of the test points header **P3**.
2. Push the buttons to be disabled (**PRGM**, **PRGM 0**, **PRGM 1**, **PRGM 2**, **PRGM 3**). One beep means the button is disabled.
3. Place the "spare" jumper back into the "spare" position of the test points header **P3**.

Enable

1. Place the "spare" jumper in the "**EN**/**DIS TP**/**FS**" position of the test points header **P3**.
2. Push the buttons to be enabled (**PRGM**, **PRGM 0**, **PRGM 1**, **PRGM 2**, **PRGM 3**). Three beeps means the button is enabled.
3. Place the "spare" jumper back into the "spare" position of the test points header **P3**.

How to Identify the Touchpad Circuit Board Components

Standard Touchpad

The standard touchpad has two LEDs for communicating status (AC Power and Data). The touchpad circuit board's Status LED is the A-dec icon, visible on the touchpad. Check the chair circuit board LEDs, as well as the touchpad, when troubleshooting.

Item #	Description
1	DS1 - AC power LED
2	DS2 - Status LEDs
3	DS3 - Data LED
4	J1 - ØVAC terminal strip
5	J1 - 24VAC terminal strip
6	P1 - Data line port (DCS)
7	J2 - Electric holder terminal strip
8	DS7 - Auxiliary 1 and bowl rinse LED
9	DS8 - Dental light LED
10	DS9 - Auxiliary 2 and cup fill LED

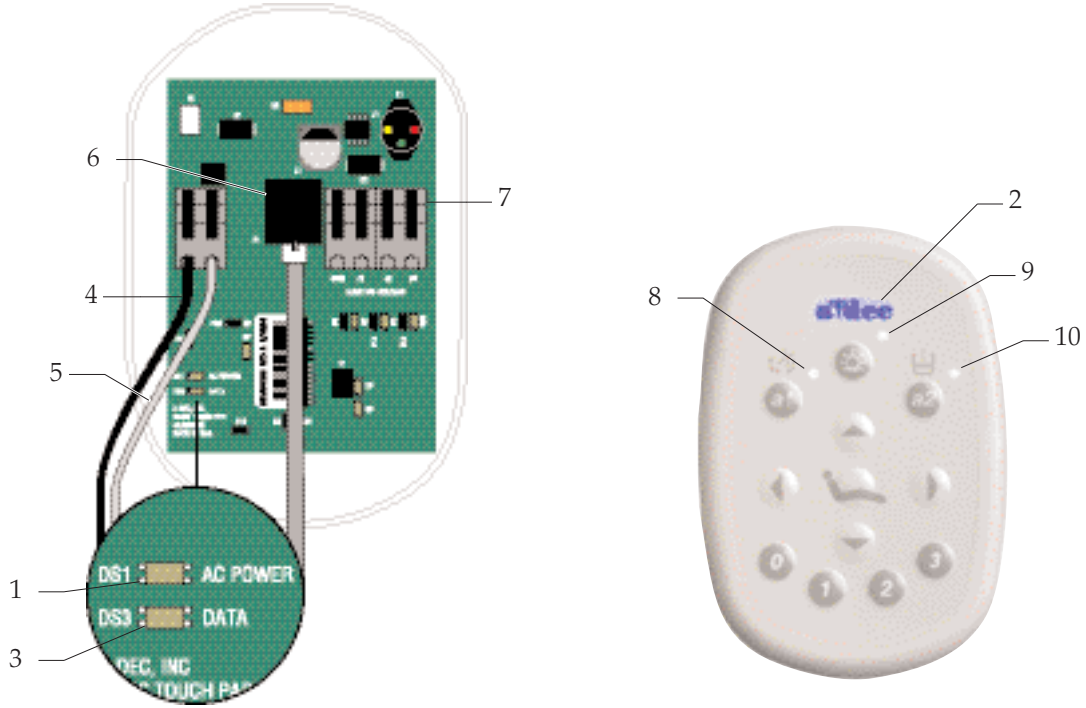

Figure 11. Standard touchpad circuit board components.

Deluxe Touchpad

Item #	Description
1	DS1 - AC power LED
2	DS2 - Status LEDs
3	DS3 - Data LED
4	J1 - Ø VAC terminal strip
5	J1 - 24 VAC terminal strip
6	P1 - Data line port (DCS)
7	P2 - LCD display connector
8	P3 - LCD back light power connector
9	DS6, DS17 - Auxiliary 1 LED
10	DS7, DS18 - Auxiliary 2 LED
11	DS8, DS19 - Bowl rinse LEDs
12	DS9, DS11 - Cup fill LEDs
13	DS10 + 20 - Dental light LEDs
14	LCD display

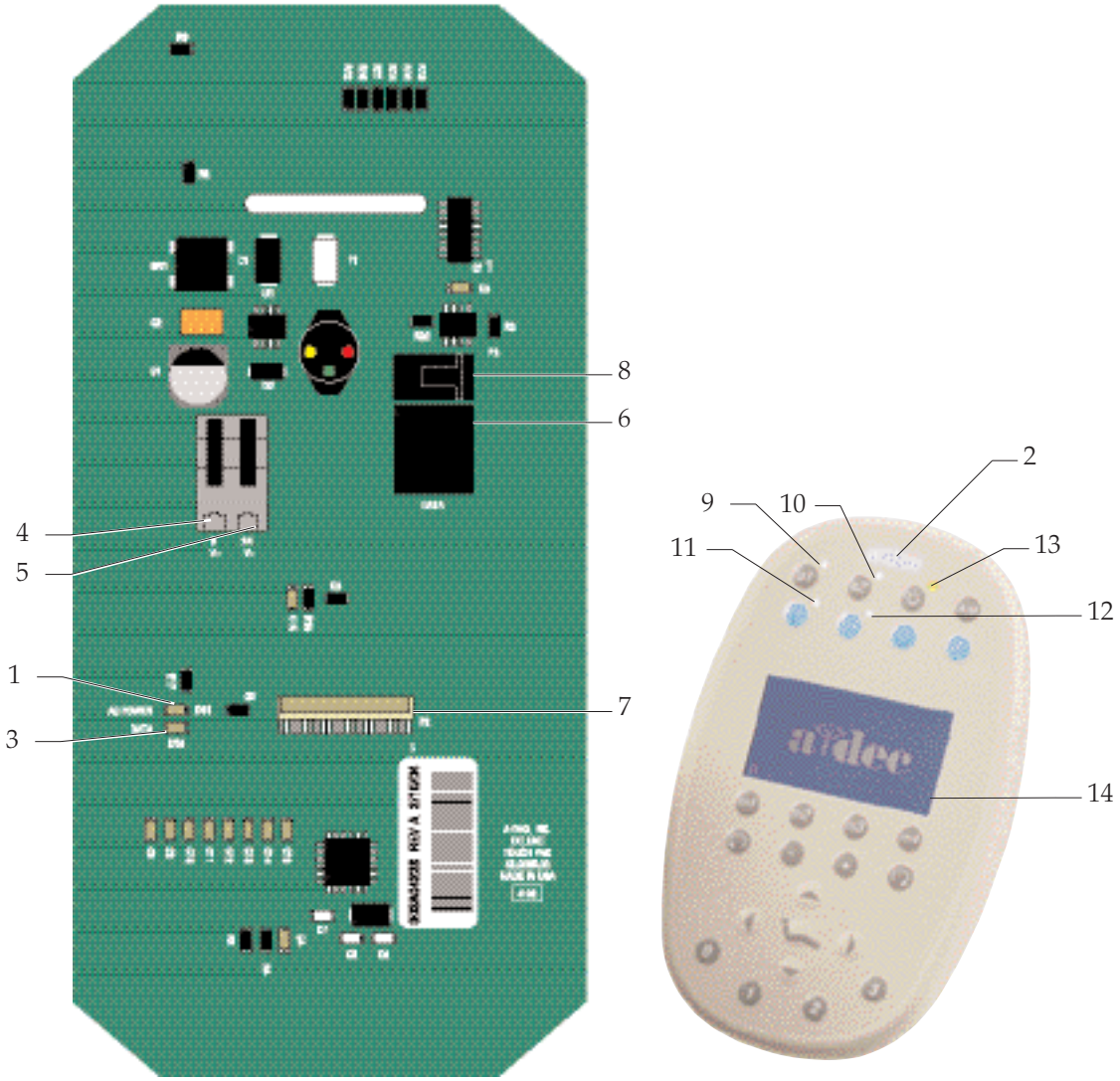

Figure 12. Deluxe touchpad circuit board components.

How to Troubleshoot the Touchpads

Tips and troubleshooting information are listed in the tables to assist in diagnosing touchpad problems. These table details how to troubleshoot the touchpad using LEDs. They are not intended to cover every situation, but do include the most common problems that may be encountered.

LED	Status	Standard Touchpad	Deluxe Touchpad
Status (A-dec logo)	Off	System is not functioning, device is disconnected, no power, or failed touchpad circuit board	
	Blue, steady	Normal condition	
	Blue, double blink	Spare jumper is in factory default position on the chair circuit board	
	Blue, slow blink	Chair or cuspidor stop switch is activated	
Dental light	Off	Dental light is off	
	Yellow, steady	Dental light is on in high or medium intensity	
	Yellow, slow blink	Dental light is on in composite setting	
Auxiliary #1 or bowl rinse	Off	Auxiliary #1 or bowl rinse is off	N/A - uses individual LEDs
	Yellow	Auxiliary #1 or bowl rinse is on	
Auxiliary #2 or cup fill	Off	Auxiliary #2 or cup fill is off	N/A - uses individual LEDs
	Yellow	Auxiliary #2 or cup fill is on	
Bowl rinse	Off	N/A - shared with auxiliary #1	Bowl rinse is off
	Yellow		Bowl rinse is on
Cup fill	Off	N/A - shared with auxiliary #2	Cup fill is off
	Yellow		Cup fill is on
Auxiliary #1 or #2	Off	N/A - shared with cup fill and bowl rinse	Auxiliary device is off
	Yellow		Auxiliary device is on

LED	Status	Description
DS1 — AC power	Off	No 24 VAC power. Check for tripped circuit breaker, power supply turned off, or no line voltage.
	Green, steady	Normal operating mode.
DS3 — Data	Off	No data communication. Data line is not connected. Data line not functioning.
	Green, steady	Detects active DCS.
	Green, blinking	Valid DCS message.

Touchpad	Problem	Possible Cause	Action
Standard and deluxe	Dental light does not turn off from the touchpad button	Operator error	Press and hold dental light button for two seconds.
	Some or all buttons do not function when pressed	Circuit board is not fully snapped into the touchpad housing, or the plastic snaps are broken off	Inspect the circuit board to make sure all six plastic snaps are secure. If plastic snaps are broken, then replace the touchpad assembly.
Deluxe	LED display is not backlit	Bad connection or broken wire	Check wires and connection at connector **P3** (back side of the circuit board).
	LED display is backlit, but does not display any text or icons	Bad circuit board Bad connection or misaligned ribbon cable in connector **P2**	1. Check status LED (**DS2**) on the front side of the touchpad. If the LED is off and AC power is on; turn power OFF and then back ON. If status LED is still off, replace the touchpad assembly. 2. If status LED is on, turn power to the touchpad OFF and remove the ribbon cable from the connector (lift up). Reinsert the ribbon cable, making sure it is located correctly, and turn the power ON.